OIPE APR 23 2004 JC33 PATENT & TRADEMARK OFFICE

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PTO/SB/21 (02-04)
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	09/967,090
Filing Date	September 27, 2001
First Named Inventor	CHEN, George C.K.
Art Unit	2872
Examiner Name	Chang, Audrey Y.
Attorney Docket Number	60617.300501

Total Number of Pages in This Submission: 19

ENCLOSURES *(Check all that apply)*

- [x] Fee Transmittal Form
- [x] Fee Attached
- [ ] Amendment/Reply
- [ ] After Final
- [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Response to Missing Parts/ Incomplete Application
- [ ] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) _____
- [ ] After Allowance communication to Technology Center (TC)
- [x] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [ ] Other Enclosure(s) (please Identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Raymond E. Roberts
Signature	
Date	April 20, 2004

CERTIFICATE OF TRANSMISSION/MAILING

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Typed or printed name	Patricia Beilmann		
Signature		Date	April 20, 2004

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PTO/SB/17 (10-03)
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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☑ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($)

Complete if Known	
Application Number	09/967,090
Filing Date	September 27, 2001
First Named Inventor	CHEN, George C.K.
Examiner Name	Chang, Audrey Y.
Art Unit	2872
Attorney Docket No.	60617.300501

METHOD OF PAYMENT *(check all that apply)*

☑ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit Account Number: 08-3240

Deposit Account Name: IPLO

The Director is authorized to: *(check all that apply)*

☑ Charge fee(s) indicated below ☑ Credit any overpayments

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below	Fee Paid
Total Claims	-20** =		X	=
Independent Claims	- 3** =		X	=
Multiple Dependent				=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	$165.00
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 165.00

SUBMITTED BY				(Complete *(if applicable)*)	
Name (Print/Type)	Raymond E. Roberts	*Registration No. (Attorney/Agent)*	38,597	*Telephone*	408 558-9950
Signature				*Date*	April 20, 2004

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Docket No.: 60617.300501

APR 23 2004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	CHEN, George C. K.		
Application No.:	09/967,090	Group No.:	2872
Filed:	09/27/2001	Examiner:	CHANG, Audrey Y.

For: ITU FREQUENCY/WAVELENGTH REFERENCE

Honorable Commissioner for Patents
P.O. Box 1450, Alexandria, VA 22313

Attn.: Board of Patent Appeals and Interferences

APPELLANT'S BRIEF (37 C.F.R. 1.192)

This brief is in furtherance of the Notice of Appeal, filed in this case on 04/04/2004.

The fees required under § 1.17, and any required petition for extension of time for filing this brief and fees there for, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 C.F.R. 1.192(a))

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Certificate of Mailing (37 CFR 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313.

APRIL 20, 2004
(date)

Patricia Beilmann
(Signature of PATRICIA BEILMANN)

This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. 1.192(c)):

I REAL PARTY IN INTEREST

II RELATED APPEALS AND INTERFERENCES

III STATUS OF CLAIMS

IV STATUS OF AMENDMENTS

V SUMMARY OF INVENTION

VI ISSUES

VII GROUPING OF CLAIMS

VIII ARGUMENTS

- A. REJECTIONS UNDER 35 U.S.C. 102
- B. REJECTIONS UNDER 35 U.S.C. 103 (1 of 2)
- C. REJECTIONS UNDER 35 U.S.C. 103 (2 of 2)
- D. SUMMARY

IX APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

The final page of this brief bears the practitioner's signature.

I REAL PARTY IN INTEREST (37 C.F.R. 1.192(c)(1))

The real party in interest in this appeal is Fibera, Inc., a Delaware corporation of 3350 Scott Blvd., #56, Santa Clara, CA 95054, which is assignee of the entire right, title and interest to the invention in the United States and in all foreign countries.

II RELATED APPEALS AND INTERFERENCES (37 C.F.R. 1.192(c)(2))

With respect to other appeals or interferences that will directly affect, or be directly effected by, or have a bearing on the Board's decision in this appeal, there are no such appeals or interferences.

III STATUS OF CLAIMS (37 C.F.R. 1.192(c)(3))

The status of the claims in this application are:

A. TOTAL NUMBER OF CLAIMS IN THE APPLICATION

Claims in the application are: 1-14

B. STATUS OF ALL OF THE CLAIMS

1. Claims canceled: None
2. Claims withdrawn from consideration but not cancelled: None
3. Claims pending: 1-14
4. Claims allowed: None
5. Claims rejected: 1-14

C. CLAIMS ON APPEAL

The claims on appeal are: 1-14

IV STATUS OF AMENDMENTS (37 C.F.R. 1.192(c)(4))

The record is unclear with respect to whether three objections have been withdrawn. These appear under the heading "Remark" on page 2 of the Office Action dated 10/06/2003. Appellant's amendment dated 01/06/2004 specifically addressed them but the Advisory Action dated 02/18/2004 does not comment on them. Specifically, the three unresolved objections are:

A. The 10/06/2003 Office Action states "*The applicant is respectfully noted that the amendments to the spec and the abstract are not complied with the rule they are therefore NOT ENTERED.*" Appellant's amendment was responsive to this, yet the Advisory Action includes no indication if that portion of the amendment was accepted and whether this objection has been withdrawn.

B. The Office Action further states "*The objections to the drawings set forth in the previous Office Action dated May 21, 2003 still HOLDS.*" Appellant's amendment was also responsive to this, yet the Advisory Action again includes no indication whether this objection has been withdrawn.

C. The Office Action yet further states "*The objections to the specification set forth in the previous Office Action still HOLDS.*" Appellant's amendment was responsive to this, in that it expressed that this appeared to be redundant. We specifically asked for clarification if our other efforts did not render these moot. The Advisory Action includes no mention of this and it is thus unclear whether this objection has been withdrawn.

Appellant proceeds herein on the basis that these objections HAVE BEEN WITHDRAWN and, if otherwise, we respectfully call upon the Office to affirmatively indicate their status in its Answer to this Brief.

V SUMMARY OF INVENTION (37 C.F.R. 1.192(c)(5))

Appellants' invention comprises apparatus and method for a wavelength reference, including at least one gas-tunable etalon. A gas-tunable etalon generally includes an etalon, such as a Fabry-Perot interferometer that has has first and second reflecting surfaces and a cavity there between. The gas-tunable etalon then has a gas-tight enclosure that surrounds the cavity. The enclosure and particularly the cavity include a medium having a variable index of refraction, which is preferably a gas whose pressure or composition has been deliberately tuned to produce a desired index of refraction. Examples are depicted FIG. 3 and 4.

The enclosure can enclose the etalon directly with the first and second reflecting surfaces acting as part of the enclosure, or these surfaces may be included in a larger enclosure which may include one or more etalons.

In operation, incident light approaches the etalon at substantially normal incidence, and is internally reflected. The reflected beams and the incident light beams interfere to create an interference pattern which produces spectral lines (see e.g., FIG. 1). In particular, the spectral lines can be adjusted to align with the International Telecommunication Union (ITU) grid by changing either the cavity thickness (i.e., the separation between the reflecting surfaces), by changing the index of refraction, or by changing the angle of incidence of the approaching light beam with respect to the reflecting surfaces.

Digressing briefly, etalons historically have been used primarily in specialized applications in laboratory environments, but this is rapidly changing, due in large part to the growing use of Wavelength Division Multiplexing (WDM) in optical fiber based communications. The traditional approach has been to build etalons to specification, with the separation between the reflecting surfaces and the angle of light beam incidence set. If anything was done with respect to the index of refraction of the cavity medium, it was to stabilize it. For example, the etalon might be housed and the housing vacuum pumped or flushed with a dry, inert gas (e.g., N_2 or CO_2).

As the need for tunable etalons emerged, two major approaches have been taken. The first is to employ a mechanism to permit changing the separation between the reflecting surfaces. Most variations of this are difficult to manufacture, but one notable exception fixes the surfaces apart with thermally active spacers and uses temperature change to expand or contract the

spacers and thus vary the surface spacing as desired. Conceptually, this is somewhat like the "ovens" used for crystals in some radio equipment. The other major prior art approach has been to change the angle of light beam incidence. Unfortunately, this only works up to a point, and it suffers from problems with beam walk-off and beam shape distortion.

In contrast, the present invention employs changes the index of refraction in a gas-tunable etalon, wherein the gas-tuning is accomplished by changing the gas pressure, the gas composition, or both. The inventor's preferred approach is to use a gas composition that is 90% N_2 and 10% He. Starting with this permits tunably increasing the index of refraction by increasing the N_2 concentration or decreasing the index of refraction by decreasing the N_2 concentration. The pressure in the cavity can be kept constant or it can also be changed to controllably adjust the tuning of the etalon. The use of pressure can be facilitated because the N_2 and He gases are typically obtained and stored in compressed form anyway. Alternately, the composition of the gas can simply be set and its pressure can be exclusively used for tuning. Gases such as N_2, CO_2, and even air (preferably dry and filtered) are suitable for this.

VI ISSUES (37 C.F.R. 1.192(c)(6))

A. Whether claims 1, 4, 5, 6, 9, 10, 13, and 14 are anticipated by Ip (U.S. Pat. No. 6,141,130; hereinafter "Ip"), and thereby unpatentable under 35 U.S.C. § 102(e).

B. Whether claims 2-3 and 7-8 are obvious over Ip in view of the Japanese Patent Tachikawa et al. (JP401250833A; hereinafter "Tachikawa"), and thereby unpatentable under 35 U.S.C. § 103(a).

C. Whether claims 11-12 are obvious over Ip in view of Tachikawa, and thereby unpatentable under 35 U.S.C. § 103(a).

VII GROUPING OF CLAIMS (37 C.F.R. 1.192(c)(7))

The grouping of the claims for purposes of this appeal is:

A. Claims 1, 4, 5, 6, 9, 10, 13, and 14, because they stand rejected as anticipated by Ip (35 U.S.C. § 102(e)).

B. Claims 2-3 and 7-8, because they stand rejected as obvious over Ip in view of Tachikawa (35 U.S.C. § 103(a)).

C. Claims 11-12, because they separately stand rejected as obvious over Ip in view of Tachikawa (35 U.S.C. § 103(a)).

VIII ARGUMENTS (37 C.F.R. 1.192(c)(8))

A. CLAIMS 1, 4, 5, 6, 9, 10, 13, AND 14 ARE NOT ANTICIPATED BY IP (35 U.S.C. § 102(e))

> "*A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.*" Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). And, "*the elements must be arranged as required by the claim ....*" MPEP 2131 discussing In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

We respectfully submit that a *prima facie* case for anticipation has not been stated, or else that the case that has been stated cannot obtain.

The Actions state "*Ip teaches a spectral equalizer (100. Figure 1) for multiplexed channels wherein the spectral equalizer comprises a Fabry Perot etalon ....*" We agree that Ip teaches a spectral equalizer – a device which is well known to those of ordinary skill in the art to have a different purpose, different principles of operation, and different structural features than a wavelength reference. The present claimed invention is a wavelength reference and methods of producing such.

For example, the first element of claim 1 includes a "*gas-tunable etalon*" and the first steps of claims 6, 13 and 14 occur in etalons which include "*a gas-tunable medium.*" Ip does not teach or reasonably suggest these elements or steps.

The Actions wrongly state that "*Ip teaches that the cavity may be filled with gas wherein by varying the density or composition due to changes in pressure, temperature or humidity the refractive index of the gas can be varied to tune the resonance and anti-resonance wavelengths of the etalon, (please see column 5, lines 20-28).*" However, this wrongly paraphrases Ip and largely overlooks what Ip does teach. For instance, at col. 5, lines 20-28 Ip actually states:

> *The* [etalon] *cavity ... can contain air or another light transmissive medium having a different refraction coefficient than air such as glass, liquid crystal or sealed gas. In embodiments wherein air or another gas is used ..., a change in density or composition--due to changes in pressure, temperature, or humidity--will affect the refractive index of the air or other gas, affecting the resonance and anti-resonance wavelengths. Thus, it is preferred to have the gas sealed or controlled to prevent wavelength drifting.* (emphasis added)

Accordingly, without hindsight based upon Appellant's disclosure, one of ordinary skill in the art would read Ip as merely teaching that gas-medium etalons need to be sealed to protect against unwanted effects "*due to changes in pressure, temperature, or humidity.*" This is clearly not teaching tuning, wherein change is intentionally applied to achieve a desired effect. Notably, the Actions do not include citations or argument that Ip is enabling with respect to a "*gas-tunable etalon*" or an etalon that includes "*a gas-tunable medium*". Accordingly, Ip does not teach or reasonably suggest such. In fact, it follows from all of this that Ip actually teaches away from the claimed invention.

Claims 1, 13 and 14 recite "*at least one reflecting surface pair*" and "*a pair of reflecting surfaces.*" In regard to this, the Actions state, "[the etalon] *is comprised of a pair of partially reflective surfaces (13 and 14) separated by a distance d to form a light transmissive resonating cavity (15).*" However, this can be said of virtually all etalons and is not determinative. Here the complete teachings of Ip have been disregarded. Ip clearly states, "*For best spectral equalization results, the spectral response R of the etalon 10 ... is optimized by adjusting the reflectivity of the reflective surfaces 13 and 14*" (col. 4, lines 55-57). This is a limitation of Ip's spectral equalizer that does not appear in the claimed invention, because the respective inventions use different principles of operation (as the following discussion shows in more detail).

The Actions go on to state:

> *Ip further teaches that by varying the properties therefore the refractive index of the gas, the Fabry Perot etalon can be tuned to align with predetermined channel spacing such as ITU channel plan, that serves as the standard wavelength, (please see column 5. lines 15-19). The gas is then sealed within the cavity so that the refractive index of the gas is fixed, (please see column 5, line 27-30). The spectral equalizer with the Fabry Perot etalon therefore provides a wavelength reference.* (emphasis in the original)

However, this is simply not correct. At col. 5 lines 15-19 IP merely states the well known fact that "*the ITU channel plan has a 100 GHz frequency grid, requiring an FSR value of substantially 100 GHz.*" In the same paragraph, Ip teaches that "*the effective distance of the path taken by the light entering* [its] *etalon can be varied by changing the dimension d of the cavity*" (col. 5, lines 2-5) and "*alternately, the input angle of an incident light beam entering* [its] *etalon 10 can be adjusted*" (col. 5, lines 5-6) and that "*Using either of such tuning techniques, spacing ...can be aligned...with a predetermined channel spacing*" (col. 5, lines 11-14).

Thus, while Ip's spectral equalizer can work with the ITU plan to equalize amplitudes, those of ordinary skill in the art will appreciate that Ip has merely taught that surface spacing and/or surface orientation to an incident beam can be used for tuning. These are, of course, the long known ways of tuning etalons – and neither is the principle of operation used by the claimed invention. For that matter, the respective inventions can even be used together, the present invention to precisely tune beam wavelengths to the ITU grid and Ip's to then equalize the spectrum of the beam amplitudes present.

In sum, a *prima facie* case for anticipation has either not been made or is now completely rebutted, and claims 1, 4, 5, 6, 9, 10, 13, and 14 should therefore be allowed.

B. CLAIMS 2-3 AND 7-8 ARE NOT OBVIOUS OVER IP IN VIEW OF TACHIKAWA (35 U.S.C. § 103(a))

> *To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.* MPEP §2142

The *prima facie* case for obviousness has not been met here because the rejection fails to meet all three of the above criteria. First, Ip and Tachikawa do not suggest combining their respectively different approaches. Second, a combination of Ip and Tachikawa would provide no reasonable expectation of success. And, the combination of Ip and Tachikawa does not teach or suggest all of the claim limitations.

FIRST, with respect to whether Ip and Tachikawa suggest or motivate combining their respectively different approaches, MPEP 2143.01 provides this additional guidance:

> *If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).*

However, the Actions state:

> ... [Ip] *does not teach explicitly to include an enclosure surrounding the cavity that is filled with the gas. Tachikawa et al in the same field of endeavor teaches an arrangement and method to vary the properties such as pressure or temperature of the gas medium in the cavity of a Fabry Perot etalon wherein a container (3. Figure 1) serves as the enclosure that is filled with the gas surrounds the cavity (2) formed by the reflective plates. By varying the properties of the gas in the container the refractive index of the gas in the cavity is varied so that the etalon is tuned.*

Respectfully, this includes numerous errors. To the extent that Tachikawa teaches any intentional variation in pressure, it is to vacuum pump a chamber containing an interferometer to remove air and replace it with Helium. Accordingly, pressure variation is not being taught for tuning. Tachikawa also does not teach intentionally varying temperature, as wrongly stated. The only property of a gas that Tachikawa teaches intentionally changing is gas composition, specifically replacing air with Helium because Helium has a lower refractive index than air. Tachikawa teaches that this is done so that unintentional changes in pressure and temperature produce smaller wavelength measurement errors.

This cannot be reconciled with Ip. As noted above, the principles of operation that Ip teaches are varying reflective surface separation and the adjusting incident light beam angle relative to the reflective surfaces (col. 5, lines 2-6 and lines 12-17). [Additionally, those of ordinary skill in the art will appreciate that Tachikawa is teaching an approach totally opposite that used by the claimed invention. Rather than affirmatively tune out error, Tachikawa accepts error as inherent and teaches a way to minimize its effect. Neither Ip or Tachikawa teach or reasonably suggest the principle of operation of the claimed invention, pressure tuning.]

Further with respect to whether Ip and Tachikawa suggest or motivate combining their respectively different approaches, MPEP 2143.01 also provides this guidance:

> *If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).*

Tuning a combination of Ip and Tachikawa would be unsatisfactory, since the low refractive index medium of Tachikawa would reduce the effect of both of the schemes for tuning that IP teaches. Replacing the medium of Ip as Tachikawa teaches would require that Ip's varying of surface separations and/or adjusting of the beam angle would need much greater adjustment, if such was even possible.

SECOND, with respect to whether a combination of Ip and Tachikawa would provide a reasonable expectation of success, the above shows that such a combination likely would not provide such an expectation. The hypothetical combination would have its tuning ability severely reduced or effectively eliminated. The low refractive index medium of Tachikawa would at he least undermine the effect of IP's varying surface separation or beam angle adjustment approached.

AND THIRD, the combination of Ip and Tachikawa does not teach or suggest all of the claim limitations. As discussed above, Ip has been relied upon as teaching or reasonably suggesting a number of elements or steps that it simply does not. Tachikawa does not remedy these deficiencies (and nothing in the Actions has argued that it does). It therefore follows that no combination of Ip and Tachikawa can teach or suggest all of the claim limitations at issue here.

Furthermore, Tachikawa does not teach or reasonably suggest what it has been relied upon for, or what the Actions asserts it teaches. The Action states:

> *... Tachikawa et al in the same field of endeavor teaches an arrangement and method to vary the properties such as pressure or temperature of the gas medium .... By varying the properties of the gas in the container the refractive index of the gas in the cavity is varied so that the etalon is tuned.*

But we have shown that Tachikawa does not teach using pressure variation for tuning, it merely teaches vacuum pumping air out of a chamber and replacing it with Helium. [And Tachikawa nowhere teaches varying temperature.] The only gas "property" that Tachikawa does teach is changing gas composition.

In sum, a *prima facie* case for obviousness has either not been made or is now completely rebutted, and claims 2-3 and 7-8 should therefore be allowed.

C. CLAIMS 11-12 ARE ALSO NOT OBVIOUS OVER IP IN VIEW OF TACHIKAWA (35 U.S.C. § 103(a))

The criteria for the *prima facie* case for obviousness have been stated above, as has various guidance with the courts have used in finding whether obviousness is supported. Here as well, we urge that the *prima facie* case for obviousness has not been met because the rejection fails to meet the three criteria for such a case. First, Ip and Tachikawa do not suggest combining

their respectively different approaches. Second, a combination of Ip and Tachikawa would provide no reasonable expectation of success. And, the combination of Ip and Tachikawa does not teach or suggest all of the claim limitations.

The Actions make various statements that we have shown above are error based on misinterpretation. Additionally, the Actions state: "*It would have been obvious to one skilled in the art to vary both the pressure and the composition to vary the refractive index of the gas for the benefit of adding more degrees of control to tune the etalon.*" This appears to concede that Ip does not teach varying pressure (or temperature), with its apparent rationale being that the two means of tuning that Ip does teach are not enough and that it would be obvious to add the additional means of varying pressure or temperature to achieve more degrees of control. This is illogical, however, because it relies on one of ordinary skill in the art appreciating that Ip is inadequate for solving the very problem which it purportedly solves. Additionally, as MPEP §2142 guides us, "*The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.*" That the combination of Ip and Tachikawa need or would provide "*more degrees of control*" is not suggested in these references. Such is pure speculation and thinking that a combination would work is also wrong, because a combination would actually provide less control, as discussed above.

The Actions reiterate:

> *Tachikawa et al in the same field of endeavor teaches an arrangement and method to vary the properties such as pressure or temperature of the gas medium .... By varying the properties of the gas in the container the refractive index of the gas in the cavity is varied so that the etalon is tuned.*

However, we have shown that Tachikawa does not teach or suggest intentionally varying pressure. It teaches the use of a low refractive index medium to minimize error due to pressure or temperature changes. Tachikawa thus does not teach or suggest tuning – it teaches error reduction, so that tuning is not needed. And the Actions continue:

> *It would then have been obvious to one skilled in the art to apply the teachings of Tachikawa et al to modify the spectral equalizer of Ip for the benefit of providing a buffer environment as intermediate means to vary the properties of the gas in the etalon so that the variation of the refractive index of the etalon therefore the tuning of the etalon could be conducted in more accurately controlled manner.*

Yet, "*providing a buffer environment as intermediate means*" is mere speculation, and even then has nothing whatsoever to do with present claims 11 and 12. As for combining Ip and Tachikawa for "*tuning of the etalon ... in more accurately controlled manner,*" the approaches Ip does teach would operate more finely if performed by also using the approach Tachikawa teaches, but then only at the cost of tuning range. In any regard, there still is no suggestion in these references to combine them even to achieve this. The approaches used still would not be that used by the claimed invention. And this would all be mere speculation, having nothing whatsoever to do with present claims 11 and 12.

In sum, a *prima facie* case for obviousness has either not been made or is now completely rebutted, and claims 11-12 should therefore be allowed.

D. SUMMARY

As has been shown herein, the Examiner has erred by failing to support the rejections with valid *prima facie* cases for anticipation or obviousness. In the alternative, even if the Actions can be interpreted as stating *prima facie* cases, Appellant has herein rebutted the putative support for the rejections. We respectfully ask the Board to reverse the Examiner and to now permit passage to issue of claims 1-14 (Groups A-C, consisting of all of the claims in the case).

IX APPENDIX OF CLAIMS INVOLVED IN THE APPEAL (37 C.F.R. 1.192(c)(9))

1. A wavelength reference comprising:

at least one gas-tunable etalon including at least one reflecting surface pair having first and second reflective surfaces; and

said reflecting surface pair surrounding a cavity, said cavity being filled with a gas-tunable medium having a variable optical index of refraction; wherein

said at least one gas-tunable etalon produces equally-spaced spectral lines which are variable in response to changes in the gas properties of said gas-tunable medium, said spectral lines being tuned to align to an external wavelength standard, and the properties of said gas-tunable medium then being fixed, so that said at least one gas-tunable etalon acts as a wavelength reference.

2. The wavelength reference of claim 1, wherein:

said etalon includes an enclosure surrounding said cavity which is filled with gas, and tuning of said etalon is done by variation in the pressure of the gas in said cavity.

3. The wavelength reference of claim 1, wherein:

said etalon includes an enclosure surrounding said cavity which is filled with gas, and tuning of said etalon is done by variation in the composition of the gas in said cavity.

4. The wavelength reference of claim 1, wherein:

said wavelength standard is the ITU grid.

5. The wavelength reference of claim 1, wherein:

said at least one etalon includes said second reflecting surface which is at least partially transmissive.

6. A method for producing a wavelength reference, comprising:

A) providing at least one etalon which includes a gas-tunable medium having an variable optical index of refraction;

B) introducing radiation into said etalon, whereby a plurality of equally spaced spectral lines is produced;

C) tuning said etalon by varying said variable optical index of refraction of said gas-tunable medium, to align said plurality of spectral lines with an external wavelength standard; and

D) fixing said variable optical index of refraction included in said etalon, so that said plurality of spectral lines produced remains substantially aligned with said external wavelength standard.

7. The method for producing a wavelength reference of claim 6, wherein:

said etalon includes an enclosure surrounding a cavity which is filled with gas, and tuning of said etalon in step C is done by varying the pressure of the gas in the cavity.

8. The method for producing a wavelength reference of claim 6, wherein:

said etalon includes an enclosure surrounding a cavity which is filled with gas, and tuning of said etalon in step C is done by variation in the composition of the gas in the cavity.

9. The method for producing a wavelength reference of claim 6, wherein:

said wavelength reference is the ITU grid.

10. The method for producing a wavelength reference of claim 6, wherein:

said at least one etalon includes a second reflecting surface which is at least partially transmissive.

11. A process for making a wavelength reference, comprising the steps of:

A) forming at least one etalon which includes a pair of reflecting surfaces and enclosure walls surrounding a cavity filled with gas of variable pressure or composition, and which produces a medium of variable optical index of refraction;

B) introducing radiation into said etalon, whereby a plurality of equally spaced spectral lines is produced;

C) tuning said etalon by varying said variable optical index of refraction, to align

said plurality of spectral lines with an external wavelength standard; and

D) fixing said variable optical index of refraction included in said etalon, so that said spectral line produced remains substantially aligned with said external wavelength standard.

12. A wavelength reference produced by the process of claim 11.

13. A method for producing an ITU wavelength reference, comprising:

A) providing at least one etalon including at least one reflecting surface pair having first and second reflective surfaces, said reflecting surface pair surrounding a cavity, said cavity being filled with a gas-tunable medium having a variable optical index of refraction inside a sealable enclosure;

B) introducing a beam of incident light into said etalon, whereby at least one spectral line is produced;

C) comparing said at least one spectral line with an ITU wavelength standard;

D) tuning said etalon by varying pressure in said etalon to adjust said variable optical index of refraction to align said at least one spectral line with said ITU wavelength standard; and

E) fixing said variable optical index of refraction included in said etalon by sealing said sealable enclosure, so that said at least one spectral line produced remains substantially aligned with said ITU wavelength standard.

14. A method for producing an ITU wavelength reference, comprising:

A) providing at least one etalon including at least one reflecting surface pair having first and second reflective surfaces, said reflecting surface pair surrounding a cavity, said cavity being filled with a gas-tunable medium having a variable optical index of refraction inside a sealable enclosure;

B) introducing a beam of incident light into said etalon, whereby at least one spectral line is produced;

C) comparing said at least one spectral line with an ITU wavelength standard;

D) tuning said etalon by varying the gas composition in said etalon to adjust said variable optical index of refraction to align said at least one spectral line with said ITU wavelength standard; and

E) fixing said variable optical index of refraction included in said etalon by sealing said sealable enclosure, so that said at least one spectral line produced remains substantially aligned with said ITU wavelength standard.

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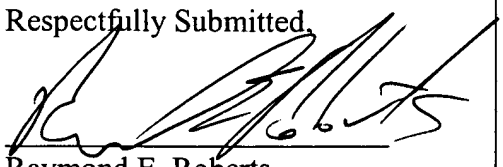

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